A brief measure of social media self-control failure

Du, Jie; van Koningsbruggen, Guido M.; Kerkhof, Peter

published in
Computers in Human Behavior
2018

DOI (link to publisher)
10.1016/j.chb.2018.02.002

document version
Publisher's PDF, also known as Version of record

citation for published version (APA)
Du, J., van Koningsbruggen, G. M., & Kerkhof, P. (2018). A brief measure of social media self-control failure. *Computers in Human Behavior*, *84*(July), 68-75. https://doi.org/10.1016/j.chb.2018.02.002

Computers in Human Behavior 84 (2018) 68–75

Contents lists available at ScienceDirect

Computers in Human Behavior

journal homepage: www.elsevier.com/locate/comphumbeh

Full length article

A brief measure of social media self-control failure

Jie Du*, Guido M. van Koningsbruggen, Peter Kerkhof

Department of Communication Science, Vrije Universiteit Amsterdam, De Boelelaan 1105, 1081 HV, Amsterdam, The Netherlands

ARTICLE INFO

Article history:
Available online 3 February 2018

Keywords:
Social media
Self-control
Temptation
Media use
Scale development

ABSTRACT

People often fail in controlling their social media use when it conflicts with other goals and obligations. To facilitate research on understanding social media self-control failures, we constructed a brief social media self-control failure (SMSCF)-scale to assess how often social media users give in to social media temptations. Social media users ($N = 405$) completed a survey (including a 4-week follow-up) to test the scale's psychometric properties. The self-report SMSCF-scale showed good internal consistency and test-retest reliability. Demonstrating its construct validity, the SMSCF-scale was moderately related to existing problematic media use and general self-control scales. Demonstrating its predictive validity, the SMSCF-scale was positively related to social media use and feelings of guilt about one's social media use and was negatively related to psychological wellbeing. The SMSCF-scale provides a useful indicator of social media self-control failure that could facilitate future research on the psychological processes underlying social media self-control failures.

1. Introduction

Mobile Internet connections and portable devices have made social media easily accessible and almost always available at any time and place (e.g., van Koningsbruggen, Hartmann & Du, 2018; Vorderer & Kohring, 2013). This constant availability of social media challenges social media users' self-control in situations where their social media use conflicts with other goals and obligations (Hofmann, Reinecke, Meier, & Oliver, 2017; Meier, Reinecke, & Meltzer, 2016; Panek, 2014; Reinecke, Hartmann, & Eden, 2014; Wilcox & Stephen, 2012). In such situations, people often fail at exerting self-control. Indeed, the desire to use media appears to be one of the most difficult desires to resist (Hofmann, Vohs, & Baumeister, 2012).

Although the failure to exert self-control in using social media, and more generally, to control one's Internet use, has been studied in numerous papers (see Lee, Ho, & Lwin, 2017, for a recent overview), not a single scale exists that directly assesses social media self-control failure as people experience it in their everyday lives. To facilitate research on understanding social media self-control failures, the present study aimed to develop a brief self-report measure of social media self-control failure.

1.1. Social media self-control failure

Social media users often face a prototypical self-control dilemma that requires choosing between the temptation to use social media and the pursuit of other goals that require volitional efforts. Think of, for instance, checking Facebook or Instagram versus studying to pass an exam, doing the dishes to clean up the kitchen, or making a social phone call to maintain a relationship. To forego the short-term pleasure of using social media that benefits the pursuit of long-term goals, social media users need to exert self-control, which can be defined as an "individual's motivation and capacity to inhibit or override a desire that stands in conflict with an endorsed self-regulatory goal or value" (Hofmann et al., 2017, p. 5).

A number of studies have demonstrated the significance of self-control of media behaviors (Hofmann, Baumeister, Förster, & Vohs, 2012a; Hofmann, Vohs, et al., 2012b; Meier et al., 2016). These studies typically show that media users frequently fail in regulating their media behaviors. For instance, one experience-sampling study showed that among the many desires that people experience on a typical day, the desire to use media is related to relatively high conflicts with other goals and causes the highest rate of self-control failure: 42% of all attempts to not give in to a media desire failed (Hofmann, Vohs, et al., 2012b). Although media use in this study included both social media use and other media use, such as TV use, it seems that social media self-control failure is highly prevalent among the general population.

* Corresponding author.
E-mail address: j.d.du@vu.nl (J. Du).

https://doi.org/10.1016/j.chb.2018.02.002
0747-5632/

Media use conflicts with a variety of goals that people may have. Hofmann, Baumeister, et al. (2012) and Hofmann, Vohs, et al. (2012), for instance, asked participants to rate the extent of perceived conflict between media use and other goals, and to choose the most frequently experienced conflicting events from a list of 20 goals (e.g., leisure, not delaying things, efficient time use, moral integrity). The results showed that the most prominent self-control conflicts with media use were about study, work, not delaying things, and using time efficiently. Similarly, Reinecke and Hofmann (2016) found that efficient time use, not delaying things and professional achievement were the activities which conflicts most with media use.

Several measures have been developed to assess the failure to control one's media use, most notably in the tradition of Internet addiction research. Although, after much debate, Internet addiction did not qualify as a behavioral addiction in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), many studies have pointed to the detrimental consequences of excessive Internet use, using scales such as the Deficient Self-regulation scale (LaRose & Eastin, 2004), the Revised Bergen Facebook Addiction Scale (Andreassen, Torsheim, Brunborg, & Pallesen, 2012), and the Generalized Problematic Internet Use Scale 2 (Caplan, 2003, 2010). In general, these measures have been applied successfully in assessing the more extremely problematic (e.g., compulsive) aspects of media use. Most studies using these scales typically reveal a relatively low prevalence of problematic media use. For example, Caplan (2010) reported a mean score of the Generalized Problematic Internet Use Scale 2 of 2.20 on an 8-point Likert scale, and Andreassen et al. (2012) reported mean scores of the Revised Bergen Facebook Addiction Scale of 1.76 on a 5-point Likert scale. As is reflected by the low means of these scales, the population of such problematic media users is small. For instance, studies among 1882 German adults (Barke, Nyenhuis, & Kröner-Herwig, 2012) and 1470 American adults (Yates, Gregor, & Haviland, 2012) reported that only 2% and 6%, respectively, of all respondents could be classified as addicted Internet users based on the Internet Addiction scale. These numbers are low when compared to the numbers reported about everyday failure to control media use (Hofmann, Baumeister, et al., 2012a; Reinecke & Hofmann, 2016).

The discrepancy between the prevalence of everyday self-control failure and the prevalence of problematic (social) media use stresses the need to develop a measure that assesses everyday social media self-control failure. Experience sampling research suggests that efficient time use, not delaying things and professional/educational achievements are the activities which caused the most conflict with media use (Hofmann, Baumeister, et al., 2012a; Reinecke & Hofmann, 2016). Accordingly, we argue that a brief 3-item measure, which assesses how often social media users give in to the desire to use social media, even though its use at that moment conflicts with other goals, makes them use their time less efficiently, and delays other things they want or need to do, could be a reliable and valid indicator of social media self-control failure. We deemed it appropriate to use a self-report measure, since experience sampling research showed that media users are aware of the conflicts between their media use and other goals (Hofmann, Baumeister, et al., 2012a; Reinecke & Hofmann, 2016).

Considering problematic social media use as a continuum that ranges from mundane self-control failures to extremely problematic or pathological forms of social media use (cf. LaRose, Lin, & Eastin, 2003), we believe that our scale measures problematic social media use at the lower end of this continuum. In contrast, existing measures more likely tap into forms of problematic social media use that fall at a higher end of this continuum. This way, we expect that our measure will facilitate future research on understanding the phenomenon of *everyday* social media self-control failure. In the current research, we tested the reliability and test-retest reliability of the proposed social media self-control failure (SMSCF)-scale over a four-week period.

1.2. Construct validity: relationships with problematic media use measures

Given that existing measures such as the Revised Bergen Facebook Addiction Scale (Andreassen et al., 2012), the Generalized Problematic Internet Use Scale 2 (Caplan, 2003, 2010) and the Deficient Self-regulation scale (LaRose & Eastin, 2004) assess people's problematic media use, we expected a positive relationship between the SMSCF-scale and the above scales. However, we expect this relationship to be moderate in strength as we expect the SMSCF-scale to tap into more mundane everyday self-control failures as opposed to the more problematic (e.g., compulsive) aspects of media use identified by these existing scales. Accordingly, we formulated the following hypothesis:

H1. The SMSCF-scale will be moderately positively related to the Revised Bergen Facebook Addiction Scale, the Generalized Problematic Internet Use Scale 2 and the Deficient Self-regulation scale.

To further establish the construct validity of the SMSCF-scale, we also investigated the relationships between the SMSCF-scale and general measures related to self-control (i.e., trait self-control and depletion sensitivity). Trait self-control refers to the individual capacity to resist temptations and control unwanted urges (Friese & Hofmann, 2009), and has been shown to relate to addictive behaviors (e.g., smoking) and deviant behaviors (e.g., cheating) (de Ridder, Lensvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012). Stemming from research showing that self-control is a limited resource that gets depleted when used (Muraven, Tice, & Baumeister, 1998), depletion sensitivity refers to individual differences in the self-control resource depletion rate (Salmon, Adriaanse, De Vet, Fennis, & De Ridder, 2014). People high in depletion sensitivity exhibit a relatively fast rate in exhausting their mental resources. As both depletion sensitivity and trait self-control reflect facets of self-control, we employed these two measures to examine the associations with social media self-control failure. We expect the SMSCF-scale to be related to both constructs:

H2. The SMSCF-scale will be positively related to depletion sensitivity and negatively related to trait self-control.

1.3. Predictive validity: relationships with time spent on social media, guilt, enjoyment, and wellbeing

Problematic use of media has been related to several, often unwanted, consequences. For instance, people who score higher on existing measures of problematic media use tend to spend more time using media (Andreassen et al., 2012; Caplan, Williams, & Yee, 2009; LaRose et al., 2003). In addition, even though social media use can provide immediate pleasure, more excessive use might offset the positive effect of social media in the long run (Sagioglou & Greitemeyer, 2014). It has been argued, for instance, that the anxiety and stress brought by excessive social media use may turn social media use into a “guilty pleasure” when people procrastinate on other important goals and tasks (Meier et al., 2016; Reinecke et al., 2014). Research suggests that when people use media to delay other tasks, they experience less enjoyment and feel more guilty about their media use (Panek, 2014; Reinecke et al., 2014). In turn, this might lead to less life satisfaction and a decrease in psychological wellbeing (Meier et al., 2016; Reinecke & Hofmann, 2016; Satici & Uysal, 2015). Based on these findings, we

formulated the following hypothesis for testing the predictive validity of the SMSCF-scale:

H3. The SMSCF-scale will be positively related to the actual use of social media and feelings of guilt about one's social media use and negatively related to social media enjoyment and subjective wellbeing.

In sum, the present study aimed at testing the reliability and validity of a brief self-report scale to assess social media self-control failure among a general population. Based on the insights of previous experience sampling research (Hofmann, Baumeister, et al., 2012a; Reinecke & Hofmann, 2016), we constructed a 3-item scale that could provide a good indicator of people's everyday social media self-control failures.

2. Method

We report how we determined our sample size, all data exclusions (if any), all manipulations (if any), and all measures in the study. Materials and data are available online at http://osf.io/m2987/.

2.1. Design, participants, and procedure

We used a survey to test the reliability and validity of the SMSCF-scale, including a four-week follow-up to investigate the test-retest reliability of the scale. We aimed at recruiting 400 participants in order to obtain a sample large enough to result in stable correlation estimations (Schönbrodt & Perugini, 2013), taking into account the potential loss of participants at the follow-up test. Prolific participants (http://www.prolific.ac/; for evidence regarding the quality of Prolific data, see Peer, Brandimarte, Samat, & Acquisti, 2017) from the US, UK, Canada, and Australia who had at least a 90% Prolific approval rating, were between 16 and 60 years old (a criterion based on the demographic statistics in Digital in 2016 Report, Simon, 2016), and used social media (any type) one or more times on a typical day (any duration) completed the online survey (programmed in Qualtrics) and were paid 2 GBP. Twenty-nine participants were excluded because they did not finish the survey (n = 20) or did not meet the inclusion criteria (n = 9).

In total, 405 participants (208 females, 197 males; $M_{age} = 31.12$ years, $SD_{age} = 10.15$ years, range 18–59 years) who met the inclusion criteria completed the Time 1 survey (average completion time of around 10 min). First, participants were asked some general questions related to their social media use, such as the platforms they used and frequency of use. Next, they completed the SMSCF-scale, followed by the scales to assess construct and predictive validity. Finally, demographic information was collected. Most participants used Facebook (94%) and visited this platform on a daily basis (84%). Also, most participants (55%) regarded Facebook as the most tempting social network site and Facebook Messenger as the most tempting messenger/chat service (38%). Most participants used their mobile phone to access social media (86%). After four weeks, all participants were invited to the follow-up survey (Time 2) of which 354 (87%) participants completed the Time 2 survey (average completion time of around 2 min, in return they received 0.45 GBP) that included assessments of social media use and the SMSCF-scale. There were no differences on Time 1 measures between participants who did and those who did not participate at follow-up ($ts = -0.23$ to 0.72, all $ps > .05$).

2.2. Time 1 measures

2.2.1. Social media self-control failure (SMSCF)-scale

Based on previous experience sampling research that identified the activities and goals most in conflict with people's media use (Hofmann, Baumeister, et al., 2012a; Reinecke & Hofmann, 2016), we constructed three items to assess social media self-control failure. Specifically, participants were asked: "How often do you give in to a desire to use social media even though your social media use at that particular moment: 1) … conflicts with other goals (for example: doing things for school/study/work or other tasks)? 2) … makes you use your time less efficiently? and 3) … makes you delay other things you want or need to do?" Participants rated the items using a 5-point scale (1 = *almost never*, 2 = *rarely*, 3 = *sometimes*, 4 = *often*, 5 = *very often*; $M = 2.99$, $SD = 0.94$, $\alpha = .87$).

2.2.2. Social media use

Based on Panek (2014), we asked participants "On average, how often do you visit social media?" Participants estimated their general social media use on a 6-point scale (1 = *less than once a day*, 2 = *once a day*, 3 = *2–3 times a day*, 4 = *once an hour*, 5 = *2–3 times an hour*, 6 = *more than 3 times an hour*; $M = 3.71$, $SD = 1.02$). We also used an open question to assess participants' time spent (in minutes) on social media in a typical week. Participants first reported the average amount of visits on weekdays (and weekend days) and then were asked to report the average duration of each visit. However, a number of outliers (57 out of 405) suggested that participants might have misunderstood the questions (e.g., they provided total amount of time per day rather than time spent per visit, which then led to an extremely high usage per week). The same situation appeared in the Time 2 survey with a number of 46 outliers out of 354. In this paper, we therefore only report the closed question used to assess social media use.

2.2.3. Estimated percentage of social media self-control failure

We asked participants to estimate the percentage of their time spent on social media on a typical day that could be described as social media self-control failure. First, participants were asked to read the following description: "We give in to a desire to use social media even though, at that particular moment, our social media use conflicts with other goals we have (for example: doing things for school/study/work or other tasks), makes us use our time less efficiently, and makes us delay things we also want or need to do." Next, using a slider-scale from 0% to 100%, participants responded to the question "On a typical day, what percentage of your time spent on social media do you estimate to be as described above?" ($M = 34.88$, $SD = 23.30$).

2.2.4. Goal conflict

To assess the goals that conflicted with participants' social media use, participants responded to the open question: "Please list below the goal, task or activity that you feel is most often in conflict with your social media use." Participants could type in their answer. We coded participants' first answer to this question, unless participants explicitly stated that one of their other answers was most in conflict with their social media use.

2.2.5. Guilt

Two items assessed how guilty participants felt about their social media use ("I often feel guilty about the amount of time I spend on social media; " "I often feel guilty about having engaged in certain activities on social media; " based on Panek, 2014). Participants responded to each item on a 5-point scale (1 = *very much unlike me*, 5 = *very much like me*; $M = 2.39$, $SD = 1.12$, $r = .65$).

2.2.6. Enjoyment

Two items assessed participants' enjoyment of their social media use ("I often enjoy the amount of time I spend on social media; "

"I often enjoy engaging in certain activities on social media; " based on the items of the guilt measure). Participants responded to each item on a 5-point scale (1 = *very much unlike me*, 5 = *very much like me*; $M = 3.63$, $SD = 0.84$, $r = .67$).

2.2.7. Wellbeing

As in Reinecke et al. (2014), we used the 10 items of the energy and tiredness subscales of the Activation Deactivation Adjective Checklist (ADACL; Thayer, 1989) to assess participants' wellbeing after social media use. In the present study, we adjusted items describing *media use* to *social media use* (e.g. "After using social media, I often feel active"). Participants rated each item on a 5-point scale (1 = *does not apply at all*, 5 = *fully applies*; $M = 2.89$, $SD = 0.75$, $\alpha = .91$).

2.2.8. Deficient self-regulation scale

We used the 7-item Deficient Self-regulation scale to measure participants' self-regulation deficiency (e.g., "I have a hard time keeping my social media use under control; " LaRose & Eastin, 2004). Participants rated each item on an 8-point scale (1 = *strongly disagree*, 8 = *strongly agree*; $M = 2.37$, $SD = 1.26$, $\alpha = .90$).

2.2.9. Revised bergen facebook addiction scale

We used the 6-item Revised Bergen Facebook Addiction Scale to measure each participant's social media addiction (Andreassen et al., 2012). Items referring to *Facebook use* were adjusted to *social media use* in the present study (e.g., "How often during the last year have you spent a lot of time thinking about social media or planned use of social media?"). Participants rated each item on a 5-point scale (1 = *very rarely*, 5 = *very often*; $M = 2.04$, $SD = 0.82$, $\alpha = .86$).

2.2.10. Generalized problematic internet use scale 2

We used the 15-item Generalized Problematic Internet Use Scale 2 to measure problematic use of social media (GPIUS2; Caplan, 2010). Items referring to *Internet use* were adjusted to *social media use* in the present study. The GPIUS2 includes items assessing five aspects of problematic social media use: preference for online social interaction (e.g., "I prefer social media interaction over face-to-face communication"), mood regulation (e.g., "I have used social media to talk with others when I was feeling isolated"), cognitive preoccupation (e.g., "I have difficulty controlling the amount of time I spend on social media"), compulsive internet use and negative outcomes (e.g., "My social media use has made it difficult for me to manage my life"). Participants rated each item on an 8-point scale (1 = *definitely disagree*, 8 = *definitely agree*; $M = 3.16$, $SD = 1.34$, $\alpha = .92$).

2.2.11. Depletion sensitivity scale

We used the 11-item Depletion Sensitivity Scale (Salmon, Adriaanse, De Vet, Fennis, & Ridder, 2014) to measure each participant's depletion sensitivity (e.g., "After I have worked very hard at something, I am not good at reloading to start a new task"). Participants rated each item on a 7-point scale (1 = *totally disagree*, 7 = *totally agree*; $M = 4.03$, $SD = 1.28$, $\alpha = .92$).

2.2.12. Brief self-control scale

We used the Brief Self-control Scale (Tangney, Baumeister, & Boone, 2004) to measure each participant's trait level of self-control (e.g., "I am good at resisting temptation"). Participants rated each item on a 5-point scale (1 = *not at all*, 5 = *very much*; $M = 3.10$, $SD = 0.75$, $\alpha = .88$).

2.3. Time 2 measures

2.3.1. SMSCF-scale

As in the Time 1 survey, participants completed the 3-item SMSCF-scale ($M = 2.95$, $SD = 0.92$, $\alpha = .88$).

2.3.2. Social media use

We asked participants "On average, how often did you visit social media in the last week?" to assess their social media use (cf. Time 1 survey, but now referring to the last week; $M = 3.32$, $SD = 1.06$). In addition, participants were asked "Compared to a typical week, did you spend less, the same, or more time on social media in the last week?" Answers were provided on a 5-point scale (1 = *much less*, 2 = *somewhat less*, 3 = *about the same*, 4 = *somewhat more*, 5 = *much more*; $M = 2.91$, $SD = 0.60$). The overall mean suggests that participants' social media use was comparable to their social media use in a typical week.

2.3.3. Estimated percentage of social media self-control failure

We asked participants to estimate the percentage of their time spent on social media on a typical day in the last week that could be described as social media self-control failure (cf. Time 1 survey, but now referring to the last week; $M = 35.14$, $SD = 23.96$).

3. Results

3.1. Reliability and item correlations

The SMSCF-scale showed good reliability, with a Cronbach's Alpha in the Time 1 survey of .87, and of .88 in the Time 2 survey. The means of the SMSCF-scale items were around the mid-point of the 5-point scale, ranging from 2.81 to 3.18 in the Time 1 survey and from 2.76 to 3.13 in the Time 2 survey. The item-total correlations of the SMSCF-scale were positive and within the range from .71 to .79 in the Time 1 survey and from .76 to .80 in the Time 2 survey (see Table 1). The item correlations of the Time 1 and Time 2 survey were all significant, ranging from .52 to .74. Moreover, the SMSCF-scale showed sufficient test-retest reliability, with a correlation between the Time 1 and Time 2 surveys of .68, $p < .001$.

3.2. Construct validity

To establish the construct validity of the SMSCF-scale, we examined its relationships with the Deficient Self-regulation scale, the Revised Bergen Facebook Addiction Scale and the General Problematic Internet Use Scale 2. As expected in H1, participants with higher scores on the SMSCF-scale reported higher deficient self-regulation, social media use addiction, and problematic social media use. Yet the correlations also indicate that the SMSCF-scale taps into a different construct compared to the other three scales. Whereas the correlations between the Deficient Self-regulation scale, the Revised Bergen Facebook Addiction Scale, and the GPIUS2 are between .78 and .84, the correlations of the SMSCF-scale with these other scales vary between .44 and .56 (see Fig. 1 and Table 2).

The means (recoded to fit a 1–5 scale) of the Deficient Self-regulation scale, the Revised Bergen Facebook Addiction Scale, and the GPIUS2 are 1.91, 2.04 and 2.23, respectively, whereas the mean of the SMSCF-scale is 2.99 (and 2.95 at Time 2). Since part of our argument is that the SMSCF-scale aims to assess a more common type of behavior, we tested whether the mean of the SMSCF-scale is higher than the means of the Deficient Self-regulation scale, the Revised Bergen Facebook Addiction Scale and the GPIUS2. We conducted three Wilcoxon signed-rank (*t'*) paired samples t-tests comparing the mean of the SMSCF-scales with the means of the

Table 1
Descriptive statistics of the items of the SMSCF-scale in the Time 1 and Time 2 surveys.

Item	Time 1			Time 2[a]		
	M	*SD*	r_{itc}	*M*	*SD*	r_{itc}
1. How often do you give in to a desire to use social media even though your social media use at that particular moment conflicts with other goals (for example: doing things for school/study/work or other tasks)?	2.81	1.06	.71[b]	2.76	1.01	.76[b]
2. How often do you give in to a desire to use social media even though your social media use at that particular moment makes you use your time less efficiently?	3.18	1.04	.79[b]	3.13	0.99	.80[b]
3 How often do you give in to a desire to use social media even though your social media use at that particular moment makes you delay other things you want or need to do?	2.98	1.07	.75[b]	2.96	1.06	.77[b]
Total	2.99	0.94	–	2.95	0.92	–

Note. r_{itc} = Item-total correlation. $N_{time1} = 405$.
[a] In the Time 2 analysis, we included one additional participant who only finished the SMSCF-scale, $N_{time2} = 355$.
[b] $p < .01$.

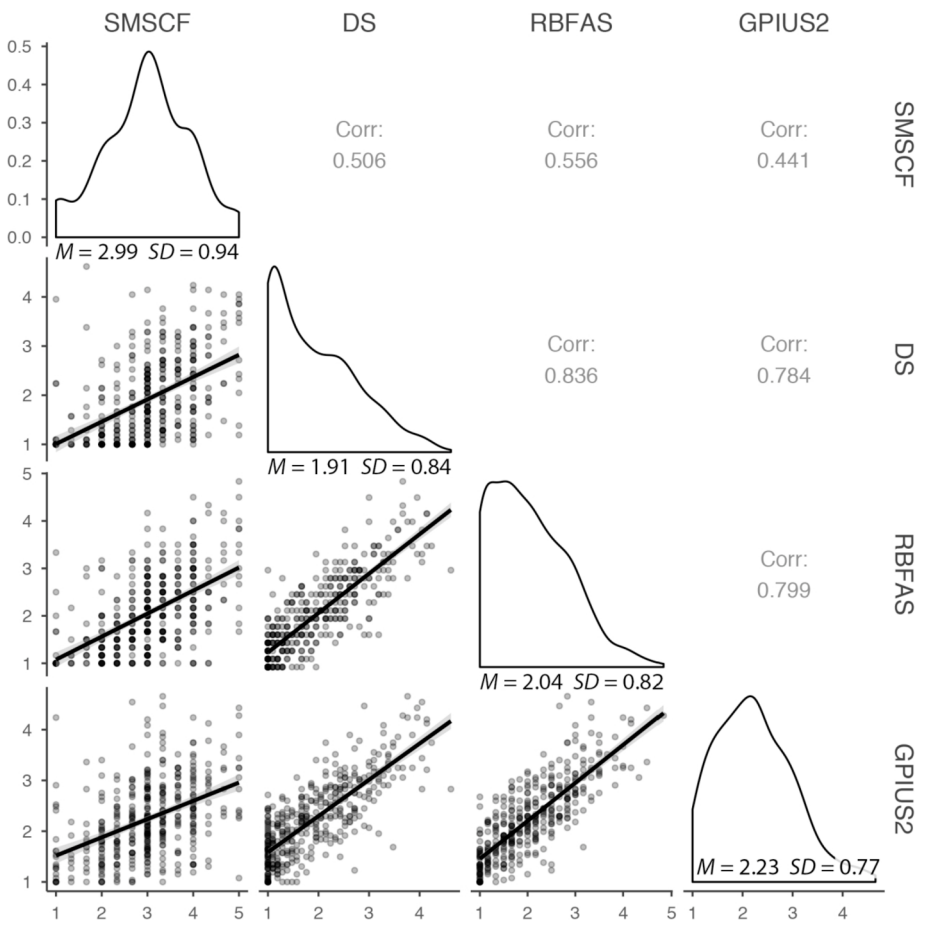

Fig. 1. *Correlations and distributions of the SMSCF, DS, RBFAS and GPIUS2 scales.* All measures were standardized to a 5-point scale. $N = 405$. SMSCF = social media self-control failure-scale; DS = Deficient Self-regulation scale; RBFAS = Revised Bergen Facebook Addiction Scale; GPIUS2 = General Problematic Internet Use Scale 2. All ps < .001.

three other scales (using the 5-point standardized measure scores). The results confirmed that the mean of the SMSCF-scale is higher than the means of the other scales ($t' = 67{,}244–72{,}865$, $ps < .001$), which further underlines the difference between the SMSCF-scale and the other problematic media use scales.

In addition, visual inspection of the distributions suggests that the distribution of the SMSCF-scale appeared to be more normal than the distributions of the other scales (Fig. 1, created with jamovi version 0.7.3; jamovi project, 2017). It should be noted, however, that Shapiro-Wilk normality tests suggest that, statistically, all scales were non-normally distributed. Nevertheless, the overall results indicate that, as expected, the prevalence of social media self-control failure is higher than the prevalence of deficient self-regulation on social media, social media addiction, or problematic social media use.

To further explore the structure of the SMSCF-scale, we conducted both a principal component analysis and a confirmatory factor analysis on the 31 items from the SMSCF-scale, the General Problematic Internet Use Scale 2, the Revised Bergen Facebook Addiction Scale and the Deficient Self-regulation scale. Principal component analysis serves as a first exploratory step in order to determine whether the SMSCF items qualify, based on statistical criteria only, as a distinct component relative to the other scales. Confirmatory factor analysis allows us to test whether a structure in

Table 2
Correlations between the SMSCF-scale and the measures for assessing constructive validity, predictive validity and demographics.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. SMSCF	–																
2. SMSCFT2[a]	0.68**	–															
3. %Fail	0.58**	0.50**	–														
4. %FailT2	0.43**	0.58**	0.54**	–													
5. Use2	0.31**	0.25**	0.28**	0.12*	–												
6. Use2T2	0.28**	0.38**	0.19**	0.30**	0.52**	–											
7. Guilt	0.55**	0.47**	0.48**	0.37**	0.19**	0.21**	–										
8. Enjoy	0.01	0.07	0.01	0.06	0.13*	0.14*	−0.06	–									
9. Wellbeing	−0.19**	−0.15**	−0.09	−0.04	0.03	0.00	−0.19**	0.43**	–								
10. DS	0.51**	0.51**	0.52**	0.46**	0.33**	0.34**	0.60**	0.07	−0.05	–							
11. RBFAS	0.56**	0.53**	0.53**	0.48**	0.33**	0.35**	0.62**	0.05	−0.10*	0.84**	–						
12. GPIUS2	0.44**	0.47**	0.46**	0.43**	0.29**	0.27**	0.48**	0.15**	−0.02	0.78**	0.80**	–					
13. DeS	0.40**	0.41**	0.30**	0.33**	0.06	0.19**	0.34**	−0.11*	−0.28**	0.38**	0.41**	0.44**	–				
14. BSCS	−0.42**	−0.41**	−0.28**	−0.27**	−0.12*	−0.22**	−0.26**	0.08	0.21**	−0.32**	−0.35**	−0.37**	−0.61**	–			
15. Use1-2	−0.06	−0.03	−0.05	0.10	−0.01	0.12*	−0.06	0.08	0.10	0.01	−0.01	−0.03	0.02	−0.05	–		
16. Sex[b]	0.04	0.17**	0.06	0.14**	0.11*	0.13*	0.09	0.04	−0.07	0.04	0.08	0.07	0.05	0.02	−0.08	–	
17. Age	−0.20**	−0.19**	−0.20**	−0.19**	−0.17**	−0.15**	−0.12*	0.14**	0.15**	−0.15**	−0.21**	−0.15**	−0.15**	0.22**	0.05	0.15**	–
M	2.99	2.95	34.88	35.14	3.71	3.32	2.39	3.63	2.89	2.37	2.04	3.16	4.03	3.10	2.91	0.51	31.12
SD	0.94	0.92	23.30	23.96	1.02	1.06	1.12	0.84	0.75	1.26	0.82	1.34	1.28	0.75	0.60	0.50	10.15
α/r	0.87	0.88	–	–	–	–	0.65	0.67	0.91	0.90	0.86	0.92	0.92	0.88	–	–	–

Note. $N_{time1} = 405$, $N_{time2} = 354$. SMSCF = social media self-control failure-scale; SMSCFT2 = social media self-control failure-scale Time 2; %Fail = percentage of time labeled as "social media self-control failure"; %FailT2 = percentage of time labeled as "social media self-control failure" Time 2; Use = frequency of social media use; UseT2 = frequency of social media use Time 2; Guilt = feeling of guilt; Enjoy = feeling of enjoyment; DS = Deficient Self-regulation scale; RBFA = Revised Bergen Facebook Addiction Scale; GPIUS2 = General Problematic Internet Use Scale 2. DeS = Depletion Sensitivity scale; BSCS = Brief Self-Control Scale; Use1-2 = Comparison between the typical time spent on social media and the time spent on social media in the last week.
** $p < .01$; * $p < .05$.
[a] We included one additional participant who only completed the SMSCF-scale at Time 2, $N = 355$.
[b] Coded as 0 = male, 1 = female.

which the SMSCF items load on one distinct factor results in an acceptable model fit.

The results of the principal component analysis, using oblimin rotation, showed that four components explained 66.9% of the model variance (KMO = .945, Bartlett's sphericity test = 10,493, $df = 465$, $p < .001$). The three items from the SMSCF-scale uniquely loaded on one component, which explained 10.2% of the total variance. All of the items that belonged to the other scales loaded higher on the component from which they stemmed than they did on the SMSCF component. All 3 SMSCF items loaded on the same component, suggesting that the SMSCF-scale possesses a unidimensional structure.

A model in which the 31 items load on the four scales they were derived from was tested through a confirmatory factor analysis, using the Lavaan package in R (Rosseel, 2012). The original model fit was unsatisfactory, $\chi^2 = 1{,}359$, $df = 406$, $p < .001$, CFI = .908, TLI = .895, RMSEA = .076, 90% CI [.072, .081], therefore we adjusted the model based on the modification indices. According to Breckler (1990), while freeing the parameters in a model, one should both take into account the substantive theoretical grounds and the data. It is also recommended that the modification should be relevant, meaningful and interpretable (Sörbom, 1989). Thus, we chose to covary the item errors based on the fact that the residual covariance should be relatively large, and that the items should be part of the same scale or subscale. The modification indices suggested that the items from the GPIUS2 "I have difficulty controlling the amount of time I spend on social media" and "I find it difficult to control my social media use" belong to the same subscale (compulsive Internet use) of the GPIUS2; the items "… spent a lot of time thinking about social media or planned use of social media" and "… felt an urge to use social media more and more" pertain to the Revised Facebook Addiction Scale; the items "I get tense, moody, or irritable if I can't get on social media when I want" and "I feel my social media use is out of control" belong to the Deficient Self-regulation scale. After allowing the error terms of these items to covary, the adjusted model showed an acceptable fit (Little, 2013), $\chi^2 = 1{,}272$, $df = 404$, $p < .001$, CFI = .916, TLI = .903, RMSEA = .073, 90% CI [.069, .078].

H2 stated that the SMSCF-scale would be positively related to depletion sensitivity and negatively related to trait self-control. The results confirm this hypothesis, as the correlations between the SMSCF-scale, the Depletion Sensitivity Scale and the Brief Self-Control Scale were .40 and −.42, respectively (both $ps < .01$, see Table 2), indicating that both high depletion sensitivity and low trait self-control are associated with higher scores on the SMSCF-scale.

3.3. Predictive validity

As expected in H3, the SMSCF-scale was negatively related to subjective wellbeing and positively related to time spent on social media, participants' estimated percentage of time spent on social media that could be labeled as "social media self-control failure," and feeling guilty about one's social media use (see Table 2). Contrary to our expectations, no significant correlation was found between the SMSCF-scale and social media enjoyment.

3.4. Goal conflict

Participants' social media use most often conflicted with their professional achievements (i.e., work and business-related affairs), educational achievements (i.e., school and study) and housework (e.g., cleaning, cooking, doing the laundry). Some of

Table 3
Reported goals/tasks that conflict with participants' social media use.

Conflict goal	Frequency	%
No conflict	69	17.0
Educational achievements (school, study etc.)	84	20.7
Professional achievements (work, business related etc.)	116	28.6
Housework (cleaning, cooking, laundry, filling in paper work for taxes etc.)	84	20.7
Other hobbies (sports, gaming)	14	3.5
Social/family/other people (meet with friends etc.)	14	3.5
Other	22	5.4
I don't know/no answer	2	.5

Note. $N = 405$.

the participants indicated that they do not experience any conflicts (see Table 3).

4. Discussion

The aim of the present research was to develop a brief self-report measure of social media self-control failure and to investigate its psychometric properties in terms of internal consistency and validity. Based on experience sampling research (Hofmann, Baumeister, et al., 2012a; Reinecke & Hofmann, 2016), we constructed a three-item SMSCF-scale that assesses how often social media users give in to the desire to use social media, even though its use at that moment conflicts with other goals, makes them use their time less efficiently, and delays other things they want or need to do. The results of the current research suggest that this scale is a reliable and valid measure of social media self-control failure.

Specifically, the SMSCF-scale showed good internal consistency, and the results demonstrated sufficient test-retest reliability. Demonstrating its construct validity, the SMSCF-scale was positively correlated with the Deficient Self-regulation scale (LaRose & Eastin, 2004), the Revised Bergen Facebook Addiction Scale (Andreassen et al., 2012), and the General Problematic Internet Use Scale 2 (Caplan, 2003, 2010). While these existing measures of problematic media use all correlated strongly with each other, the SMSCF-scale was only moderately correlated to these scales. Additionally, the significant mean differences between the SMSCF-scale and the other scales further confirm the distinction between social media self-control failure and the other forms of problematic social media use. The results of both the principal components analysis and the confirmatory factor analysis revealed that the SMSCF-scale has a unidimensional structure. All three items of the SMSCF-scale loaded on a distinct factor from the items of the General Problematic Internet Use Scale 2, the Revised Bergen Facebook Addiction Scale, and the Deficient Self-regulation scale. These results also suggest that the SMSCF-scale is distinguishable from available measures of problematic media use. Furthermore, and in contrast to the often-observed low means on these existing scales, the mean scores on the SMSCF-scale were around the midpoint of the scale, giving rise to more normally-distributed scale scores. This reflects that the SMSCF-scale might tap into more mundane, everyday forms of social media self-control failure that seem to be more prevalent than more problematic forms of media use, such as social media addiction.

Additionally, the SMSCF-scale was positively correlated with depletion sensitivity (Salmon et al., 2014) and negatively related to trait self-control (Tangney et al., 2004). The observed correlations with these general concepts related to self-control were moderate in size. This suggests that being sensitive to depleting circumstances in general does not necessarily mean that one is sensitive to experiencing social media self-control failures. In a similar vein, being generally capable of exerting self-control does not automatically translate to being capable of controlling one's social media use when it conflicts with other tasks and obligations. This might also be true for relationships between the SMSCF-scale and other variables related to self-control. For instance, some people might be highly impulsive in general without experiencing frequent lapses of social media self-control. Investigating whether the SMSCF-scale is also only moderately related to impulsivity and other general concepts related to self-control could be an important avenue for future research.

Demonstrating its predictive validity, the SMSCF-scale further proved to be meaningfully related to social media use, guilt, and subjective wellbeing. Participants who scored higher on the SMSCF-scale used social media more often and estimated a larger percentage of their time spent on social media as "giving in to the temptation to use social media." In addition, participants who scored higher on the SMSCF-scale reported feeling more guilt about their social media use and lower levels of subjective wellbeing after using social media. These findings are in line with previous research (Panek, 2014; Reinecke et al., 2014; Satici & Uysal, 2015).

We assumed that people reporting high social media self-control failure would feel less enjoyment after social media use. Yet, unexpectedly, the SMSCF-scale was unrelated to social media enjoyment. Teasing apart the role of enjoyment as both a possible predictor of SMSCF and as a possible outcome of SMSCF may help to gain further insight into the relation between SMSCF and enjoyment. On the one hand, enjoying social media may precede and positively predict the use of social media (e.g., Nabi & Krcmar, 2004), which consequently may result in increased levels of SMSCF, thus indicating a positive relationship between SMSCF and enjoyment. On the other hand, as we argued in this paper, lower enjoyment may be a consequence of SMSCF, cf. earlier work by Panek (2014) and Reinecke et al. (2014). Cross-sectional studies are not able to tease apart these different processes. Longitudinal studies are needed to help shed light on the relationship between SMSCF and enjoyment that may be more complicated than previously argued.

Consistent with previous findings (Hofmann, Baumeister, et al., 2012a; Reinecke & Hofmann, 2016), goals or tasks that were most in conflict with participants' social media use appeared to be related to educational (school/study) and professional achievements (getting things done at work). In addition, in the current sample, housework (e.g., doing the laundry) was also often mentioned as being challenged by participants' social media use.

Several limitations of the current research need to be acknowledged. First, we relied on self-report measures. This could affect the reliability of our measures, as participants, for instance, may have experienced difficulties in recalling their behaviors and feelings related to their social media use. With regard to the SMSCF-scale, it should be noted, however, that a self-report measure seems appropriate, as experience sampling research suggests that media users are aware of the conflicts between their media use and other goals (Hofmann, Baumeister, et al., 2012a; Reinecke & Hofmann, 2016). Second, due to the cross-sectional nature of our Time 1

data, we could not fully establish predictive validity of the SMSCF-scale with regard to feelings of guilt about one's social media use, social media enjoyment, and subjective wellbeing after social media use. Future research should aim to study these relationships, for instance, by using longitudinal methods. Third, in the current research we did not investigate the relationship between social media self-control failure and procrastination. Procrastination, which can be defined as "self-regulatory failure of not exerting self-control necessary for task engagement" (Meier et al., 2016, p. 66), appears to conceptually overlap with our operationalization of social media self-control failure. Both constructs share properties such as the consideration of conflict between goals and delaying other tasks. Importantly, the two concepts differ in that procrastination measures appear to predominantly refer to competing aversive (e.g., more difficult, effortful or anxiety-inducing) tasks (Reinecke & Hofmann, 2016), whereas our SMSCF-scale does not preclude competing pleasurable tasks (e.g., reading a novel or meeting with friends). This way we believe that the SMSCF-scale is different from procrastination in general and might act as a better predictor of lapses in controlling one's social media behavior. Nevertheless, future research should investigate how the SMSCF-scale relates to and differs from procrastination scales. Finally, future research should further confirm the reliability of the SMSCF-scale in different samples.

In conclusion, the SMSCF-scale appears to be a reliable and valid measure of social media self-control failure. We believe that this brief measure of social media self-control failure could be successfully used to investigate differences between social media users that often versus less often fail in controlling their social media use. This, in turn, will advance research on the psychological processes contributing to everyday social media self-control failure. The SMSCF-scale might also be used as a dependent variable in future research testing the effectiveness of interventions designed to decrease social media users' self-control failures. Overall, we conclude that the SMSCF-scale will benefit future research as it offers an efficient and reliable way of measuring everyday social media self-control failure.

Acknowledgements

This work was supported by a grant from the China Sponsorship Council awarded to Jie Du.

References

jamovi project (2017). jamovi (Version 0.8) [Computer Software]. Retrieved from https://www.jamovi.org

Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. (2012). Development of a Facebook addiction scale. *Psychological Reports, 110*(2), 501–517. https://doi.org/10.2466/02.09.18.PR0.110.2.501-517.

Barke, A., Nyenhuis, N., & Kröner-Herwig, B. (2012). The German version of the internet addiction test: A validation study. *Cyberpsychology, Behavior, and Social Networking, 15*(10), 534–542. https://doi.org/10.1089/cyber.2011.0616.

Caplan, S. E. (2003). Preference for online social interaction: A theory of problematic internet use and psychosocial well-being. *Communication Research, 30*(6), 625–648. https://doi.org/10.1177/0093650203257842.

Caplan, S. E. (2010). Theory and measurement of generalized problematic internet use: A two-step approach. *Computers in Human Behavior, 26*(5), 1089–1097. https://doi.org/10.1016/j.chb.2010.03.012.

Caplan, S. E., Williams, D., & Yee, N. (2009). Problematic Internet use and psychosocial well-being among MMO players. *Computers in Human Behavior, 25*(6), 1312–1319. https://doi.org/10.1016/j.chb.2009.06.006.

Friese, M., & Hofmann, W. (2009). Control me or I will control you: Impulses, trait self-control, and the guidance of behavior. *Journal of Research in Personality, 43*(5), 795–805. https://doi.org/10.1016/j.jrp.2009.07.004.

Hofmann, W., Baumeister, R. F., Förster, G., & Vohs, K. D. (2012a). Everyday temptations: An experience sampling study of desire, conflict, and self-control. *Journal of Personality and Social Psychology, 102*(6), 1318–1335. https://doi.org/10.1037/a0026545.

Hofmann, W., Reinecke, L., Meier, A., & Oliver, M. (2017). Of sweet temptations and bitter aftertaste: Self-control as a moderator of the effects of media use on well-being. In *The Routledge handbook of media use and well-being: International perspectives on theory and research on positive media effects* (pp. 211–222).

Hofmann, W., Vohs, K. D., & Baumeister, R. F. (2012b). What people desire, feel conflicted about, and try to resist in everyday life. *Psychological Science, 23*(6), 582–588. https://doi.org/10.1177/0956797612437426.

LaRose, R., & Eastin, M. S. (2004). A social cognitive theory of Internet uses and gratifications: Toward a new model of media attendance. *Journal of Broadcasting & Electronic Media, 48*(3), 358–377. https://doi.org/10.1207/s15506878jobem4803_2.

LaRose, R., Lin, C. A., & Eastin, M. S. (2003). Unregulated Internet usage: Addiction, habit, or deficient self-regulation? *Media Psychology, 5*(3), 225–253. https://doi.org/10.1207/S1532785XMEP0503_01.

Lee, E. W., Ho, S. S., & Lwin, M. O. (2017). Explicating problematic social network sites use: A review of concepts, theoretical frameworks, and future directions for communication theorizing. *New Media & Society, 19*(2), 308–326. https://doi.org/10.1177/1461444816671891.

Little, T. D. (2013). *Longitudinal structural equation modeling*. Guilford Press.

Meier, A., Reinecke, L., & Meltzer, C. E. (2016). "Facebocrastination"? Predictors of using Facebook for procrastination and its effects on students' well-being. *Computers in Human Behavior, 64*, 65–76. https://doi.org/10.1016/j.chb.2016.06.011.

Muraven, M., Tice, D. M., & Baumeister, R. F. (1998). Self-control as a limited resource: Regulatory depletion patterns. *Journal of Personality and Social Psychology, 74*(3), 774–789. https://doi.org/10.1037/0022-3514.74.3.774.

Nabi, R. L., & Krcmar, M. (2004). Conceptualizing media enjoyment as attitude: Implications for mass media effects research. *Communication Theory, 14*(4), 288–310. https://doi.org/10.1111/j.1468-2885.2004.tb00316.x.

Panek, E. (2014). Left to their own Devices: College Students'"Guilty pleasure" media use and time management. *Communication Research, 41*(4), 561–577. https://doi.org/10.1177/0093650213499657.

Peer, E., Brandimarte, L., Samat, S., & Acquisti, A. (2017). Beyond the Turk: Alternative platforms for crowdsourcing behavioral research. *Journal of Experimental Social Psychology, 70*, 153–163. https://doi.org/10.1016/j.jesp.2017.01.006.

Reinecke, L., Hartmann, T., & Eden, A. (2014). The guilty couch potato: The role of ego depletion in reducing recovery through media use. *Journal of Communication, 64*(4), 569–589. https://doi.org/10.1111/jcom.12107.

Reinecke, L., & Hofmann, W. (2016). Slacking off or winding Down? An experience sampling study on the drivers and consequences of media use for recovery versus procrastination. *Human Communication Research, 42*, 441–461. https://doi.org/10.1111/hcre.12082.

de Ridder, D. T., Lensvelt-Mulders, G., Finkenauer, C., Stok, F. M., & Baumeister, R. F. (2012). Taking stock of self-control: A meta-analysis of how trait self-control relates to a wide range of behaviors. *Personality and Social Psychology Review, 16*(1), 76–99. https://doi.org/10.1177/1088868311418749.

Rosseel, Y. (2012). Lavaan: an R package for structural equation modeling. *Journal of Statistical Software, 48*(2), 1–36.

Sagioglou, C., & Greitemeyer, T. (2014). Facebook's emotional consequences: Why Facebook causes a decrease in mood and why people still use it. *Computers in Human Behavior, 35*, 359–363. https://doi.org/10.1016/j.chb.2014.03.003.

Salmon, S. J., Adriaanse, M. A., De Vet, E., Fennis, B. M., & De Ridder, D. T. (2014). "When the going gets tough, who keeps going?" Depletion sensitivity moderates the ego-depletion effect. *Frontiers in Psychology, 5*, 647. https://doi.org/10.3389/fpsyg.2014.00647.

Satici, S. A., & Uysal, R. (2015). Well-being and problematic Facebook use. *Computers in Human Behavior, 49*, 185–190. https://doi.org/10.1016/j.chb.2015.03.005.

Schönbrodt, F. D., & Perugini, M. (2013). At what sample size do correlations stabilize? *Journal of Research in Personality, 47*(5), 609–612. https://doi.org/10.1016/j.jrp.2013.05.009.

Simon, K. (2016). *Digital in 2016 report*. Retrieved from https://wearesocial.com/uk/special-reports/digital-in-2016.

Sörbom, D. (1989). Model modification. *Psychometrika, 54*(3), 371–384. https://doi.org/10.1007/BF02294623.

Tangney, J. P., Baumeister, R. F., & Boone, A. L. (2004). High self-control predicts good adjustment, less pathology, better grades, and interpersonal success. *Journal of Personality, 72*(2), 271–324. https://doi.org/10.1111/j.0022-3506.2004.00263.x.

van Koningsbruggen, G. M., Hartmann, T., & Du, J. (2018). Always On? Explicating impulsive influences on media use. In P. Vorderer, L. Hefner, L. Reinecke, & C. Klimmt (Eds.), *Permanently online, permanently Connected: Living and communicating in a POPC world* (pp. 51–60). New York: Routledge.

Vorderer, P., & Kohring, M. (2013). Permanently online: A challenge for media and communication research. *International Journal of Communication, 7*, 188–196.

Wilcox, K., & Stephen, A. T. (2012). Are close friends the enemy? Online social networks, self-esteem, and self-control. *Journal of Consumer Research, 40*(1), 90–103. https://doi.org/10.1086/668794.

Yates, T. M., Gregor, M. A., & Haviland, M. G. (2012). Child maltreatment, alexithymia, and problematic internet use in young adulthood. *Cyberpsychology, Behavior, and Social Networking, 15*(4), 219–225. https://doi.org/10.1089/cyber.2011.0427.